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excess of some of the salts common in sea water. Moreover, eggs that have not been fertilized may cleave in such changed sea water, and in this cleavage there are divisions and distributions of chromosomes with accompanying activities of centrosomes and of asters.

There is, of course, room for doubt and for difference of opinion as to the light shed by these abnormal processes upon the normal ones in the basic phenomena of fertilization and of cleavage. The author cites facts that show the power of the egg to cleave without the centrosome and the aster, and thinks the chromosome part of the nucleus the most influential part of each cell. As cleavage may take place without reference to asters, mechanical hypotheses of contractile bands or pushing rods seem to him unnecessary.

Centrosomes, he thinks, may be formed *de novo* from protoplasm outside the nucleus or within it, and may sometimes persist and in other cases be of short life. His results are to some extent iconoclastic, and he would depose the centrosome from its assumed rôle of hereditary monarch.

The author sees in these results of adding salts no direct mechanical phenomena, but only the reactions of living eggs when stimulated by changed environment. The egg becomes more a living thing than it seemed when we were ignorant of these possibilities.

Holding this standpoint, the author would do well to abandon his term "artificial stars," since it does not appear that these reactions to salts are more *artificial* than those produced by adding sperm, nor, in fact, than the reaction of a frog's leg when salt is placed upon it.

E. A. A.

History of the Natural Sciences.—The first volume of Dannemann's *Grundriss einer Geschichte der Naturwissenschaften*, which contains so admirable a series of selections from the works of the most distinguished natural scientists of the past, has been supplemented by a second volume,¹ in which the historical development of the natural sciences is dealt with. The subject-matter of this volume is largely astronomical, physical, and chemical; and the arrangement essentially chronological. While it is to be admitted that chemistry and physics are in a sense more fundamental than the biological sciences, and, therefore, deserve a certain degree of precedence in an historical account, it is to be regretted that so important

¹ Dannemann, F. *Grundriss einer Geschichte der Naturwissenschaften*; 2. Bd., *Die Entwicklung der Naturwissenschaften*, 435 pp., 76 illustrations. Leipzig, W. Engelmann. 1898.

and interesting a subject as the historical development of the biological sciences should have been passed over so lightly as in the present volume; for of its 425 pages only about 30 are devoted to the growth of biology, whereas in the first volume the biological selections cover some hundred of its 325 pages. Excepting for this disproportionateness, the second volume is fully equal to the first, and will afford profitable reading to those interested in the development of physical and chemical science. The work is well illustrated. G. H. P.

ANTHROPOLOGY.

The Races of Europe.¹—In the preface to this important work Professor Ripley states that “it represents merely an honest effort to coördinate, illustrate, and interpret the vast mass of original material—product of years of patient investigation by observers in all parts of Europe—concerning a primary phase of human association: that of race or physical relationship.” The book itself is the product of a vast amount of patient research, nor is the modest disclaimer of its author, that it contains nothing that is, strictly speaking, original, to be taken too literally. In some respects this volume justifies the statement that the Caucasian division of the human family “is in point of fact the most debatable in the whole range of anthropological studies”; on the other hand, it contributes more than any other single publication to refute the charge by bringing “this abundant store of raw material into some sort of orderly arrangement,” and in its lucid exposition of the facts relating to the more difficult problems.

The work is based upon a course of lectures upon “physical geography and anthropology,” subsequently published in *Appletons' Popular Science Monthly*; the notices thus called forth have sufficiently commended the plan and purpose of the work. The introductory chapter emphasizes the significance of geography from the standpoint of human interests; in fact, the interrelation of race and environment is the keynote of the whole volume. In his chapter upon language, nationality, and race the author maintains that the fundamental importance of ethnic conquests has not been commonly recognized by historians, and that it is not the direct relation of his-

¹ Ripley, W. Z. *The Races of Europe*. New York, D. Appleton & Co. 1899. 8vo, 624 pp.